Idaho State Department of Agriculture
Division of Agricultural Resources

# Dennett Creek
# Water Quality Monitoring Report
## April 2003 through October 2003

Kirk Campbell
Idaho State Department of Agriculture

ISDA Technical Report Summary W-10

December 2003

## Introduction

The Idaho State Department of Agriculture (ISDA) recently completed a water quality monitoring program on Dennett Creek. The monitoring was conducted at the request of the Weiser River Watershed Advisory Group (WAG). Dennett Creek is listed on the state 303(d) list for having potential water quality impairment due to flow alteration, sediment, and temperature. Dennett Creek resides within Hydrological Unit Code (HUC) 17050201 and was scheduled for Total Maximum Daily Load (TMDL) development in 2001 (Figure 1).

Monitoring was conducted during the critical period of the year (April through September) as defined by the Idaho State Department of Environmental Quality (IDEQ) for the Snake River Hells Canyon TMDL. ISDA monitored twice a month from April through October of 2003 for total suspended solids (TSS), total phosphorus (TP) and ortho-phosphorus (OP). On-site measurements for dissolved oxygen, temperature, % saturation, conductivity, total dissolved solids, pH, and discharge were collected during each monitoring trip.

## General Results

### Total Suspended Solids (TSS)

TSS values for Dennett Creek were all low with six out of 14 samples below the laboratory detection limit of 3 mg/L. The highest measured TSS level was 18 mg/L which was recorded in May 2003 (Figure 2). Although the overall TSS concentrations were low there appears to be a correlation ($R^2$=0.81) between the discharge rate and the level of TSS within the water column.

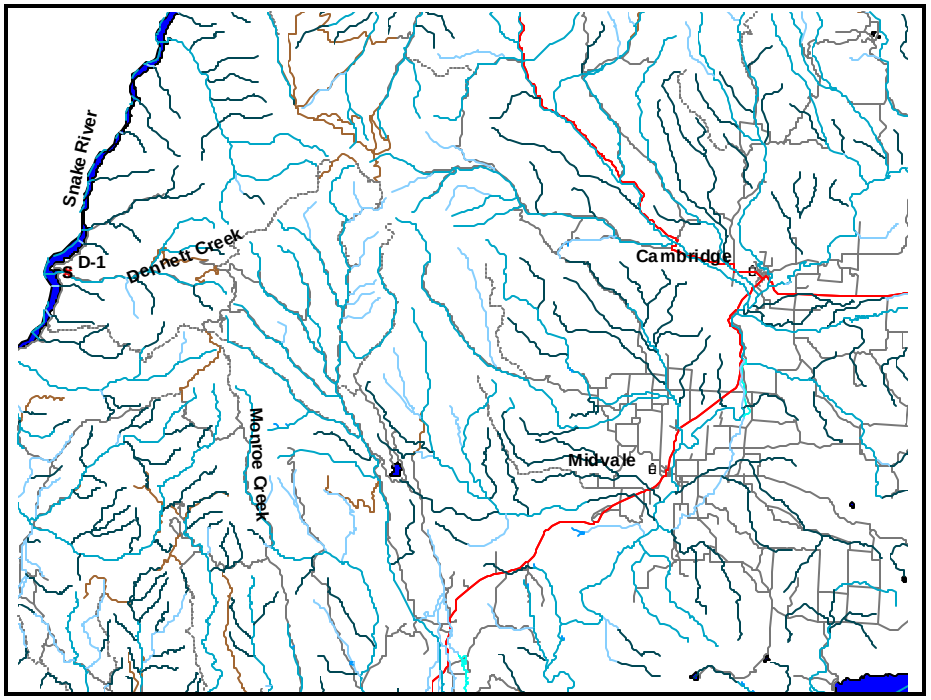


**Figure 1**. Dennett Creek Monitoring Site (D-1)

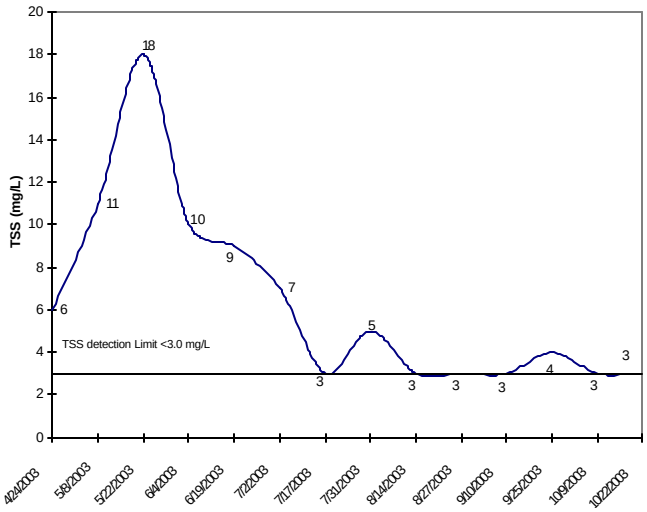


**Figure 2.** TSS values Dennett Creek

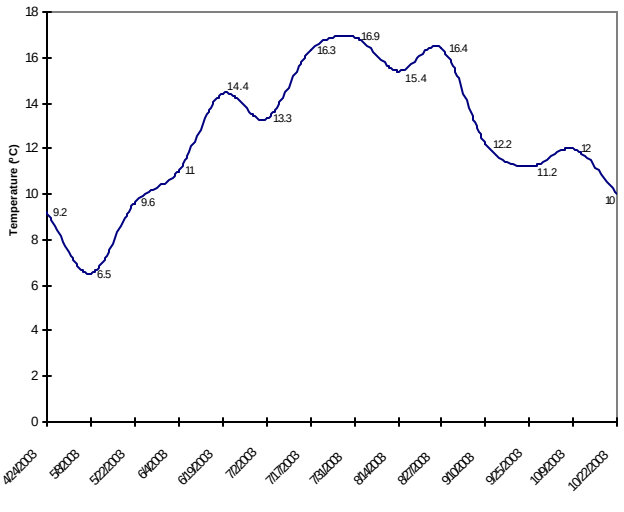


**Figure 3.** Instantaneous temperature ($^{o}$ C)

The water clarity was good to excellent on every visit to Dennett Creek. The substrate consisted of small and large cobbles with medium to coarse gravels. Visually the stream bed did not appear to be excessively embedded by fine gravel, sands or silts. The riparian area was in relatively good shape with lots of woody debris within channel. There did not appear to be a lot of damage from cattle activity along the creek bank. There were some large cut banks further upstream that could affect sediment transport during heavy rain snow runoff events.

## Phosphorus

Dennett Creek was not 303 (d) listed as having nutrients as a potential water quality concern. The Weiser WAG requested that ISDA collect samples for both total phosphorus and ortho phosphorus analysis.

All 14 samples collected for total and ortho phosphorus were below the laboratory method detection limit of 0.05 mg/L.

## Temperature

Dennett Creek has temperature listed as a possible pollutant of concern. Dennett Creek is listed for cold water biota which requires a water temperature of 22$^{o}$ C or less; with a maximum daily average of no greater than 19$^{o}$ C.

There appeared to be suitable canopy in the areas we observed to provide suitable shading for temperature control. Only instantaneous measurements were taken during this program. The highest recorded temperature was 16.9$^{o}$ C on July 31, 2003 (Figure 3).

## Dissolved Oxygen

Waters designated for cold water biota are to exhibit dissolved oxygen concentrations exceeding 6 mg/L at all times. The instantaneous measurements for dissolved oxygen all exceeded this criteria (Figure 4).

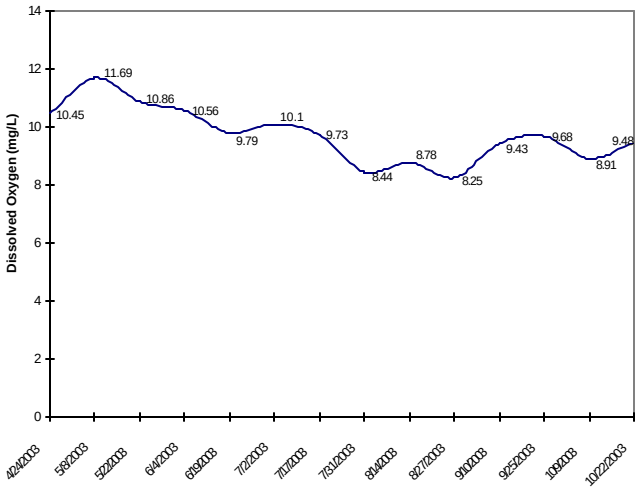


**Figure 4.** Instantaneous dissolved oxygen (mg/L)

## Discharge

Flow alteration is listed as a possible water quality issue for Dennett Creek. Dennett Creek had water present throughout the monitoring program. The peak discharge (6.27 ft$^3$) occurred in May 22, 2003 and the lowest discharge (0.19 ft$^3$) took place on August 27th. These discharge measurements represent flows during a drought situation. As Brownlee Reservoir water level recedes during the summer months Dennett Creek seeps into the loose gravels and eventually becomes disconnected from Brownlee.

## Observations

The photographs on this page only represent a small area of Dennett Creek. From our sampling point (Photo 1) the upstream sites (Photo 2 &3) only encompass approximately 1.5 miles. Dennett Creek is approximately 6.5 miles long and the creek's condition in the upper reaches were not visually evaluated during this program. Photograph 1 is our sampling location and is just above where Dennett Creek drops down through a culvert into a gravel washout area prior to reaching Brownlee Reservoir (Photo 4).

The riparian area that was viewed (Primarily photo's 1, 2, and 3) appeared to be relatively healthy with good vegetation and plenty of woody debri within channel. There was very little sign of cattle activity in and along the banks and only a few cattle were observed within the area during our visits. There were some cut banks further up on Dennett Creek but the area still appeared to be well vegetated with the stream still having good access to the flood plain.

By mid September and into October Brownlee Reservoir's water level has been severely drawn down. Dennett Creek no longer reaches Brownlee Reservoir by October (Photo 6).

## Conclusion

The period of data collection on Dennett Creek coincided with the continued drought conditions that are currently impacting Idaho. This data may not represent conditions during a more normal precipitation year.

The total suspended solid (TSS) concentration within the water column of Dennett Creek was very low. Of the 14 samples collected, six had concentration levels lower than the laboratory detection limit of 3 mg/L. The highest TSS level measured during this study occurred in May (18 mg/L). Phosphorus does not appear to be a nutrient of concern within Dennett Creek. As with most higher elevation streams the bulk of discharge along with any associated load occurs during spring runoff or rain/snow events.

Dennett Creek, due to its size, would have very minimal impact on Brownlee Reservoir as far as pollutant transport. The actual load provided by Dennett either in sediment or nutrients would have little if any overall impact on the water quality of Brownlee Reservoir.

.

Photo # 1. ISDA sampling site on lower Dennett Creek (May)

Photo # 2. Dennett Creek upstream of sampling site (May).

Photo #3. Upstream areas on Dennett Creek (May).

Photo # 4. Lower Dennett entering Brownlee cove (May).

Photo #5. Arm of Brownlee Reservoir in August exhibiting large algae blooms (late September).

Photo #6. Dennett in October no connectivity to Brownlee